

What is claimed is:

1) A system for machining the space between bones of a joint, comprising:

a) a milling tool, comprising:

- 5           (1) a power source attachment located at a distal end of the milling tool;  
            (2) a longitudinally extending barrel having first and second transverse guide  
            blocks adapted to interact with a machining fixture to limit the longitudinal  
            position and rotational or translational movement of the milling tool; and  
            (3) a milling head located at the proximal end of the milling tool, adapted for  
10           at least partial insertion into the space between bones of a joint and adapted  
            to contact the bones of the joint upon rotation about a pivot point or  
            translation, the milling head comprising:

- (i) a cutting head drive adapted to rotate a cutting head around an axis  
            substantially perpendicular to the axis of the longitudinally  
15           extending barrel; and  
            (ii) a cutting blade disposed on the cutting head, comprising a base  
            disk, a radially extending cutting flute, and at least one opening in  
            the base disk adapted to allow cooling fluids to contact the bone and  
            remove debris.

20           2) The system of claim 1, wherein the milling head comprises between one and four  
            radially extending cutting flutes.

25           3) The system of claim 1, wherein the second guide block limits the longitudinal  
            position of the milling head within the space between bones of the joint.

            4) The system of claim 1, wherein the first guide block limits the rotational or  
            translational movement of the milling head .

- 5) The system of claim 1, wherein the second guide block limits the longitudinal position of the milling head within the space between bones of the joint, and the first guide block limits the rotational movement of the milling head about a pivot point located at or near the second guide block, whereby the second guide block is positioned proximate to the first guide block along the barrel.
- 6) The system of claim 1, wherein the longitudinally extending barrel has a variable length.
- 7) The system of claim 1, wherein the axis of the milling head is at an angle relative to the axis of the longitudinally extending barrel, and wherein the axis of rotation of the cutting head is perpendicular to the axis of the milling head.
- 8) The system of claim 7, wherein the angle is between about 3° and about 10° relative to the axis of the longitudinally extending barrel.
- 9) The system of claim 1, further comprising:
- a) a machining fixture adapted to receive and guide the milling tool, comprising:
    - (1) a first stop adapted to cooperate with the first guide block of the milling tool to limit the rotational motion of the milling tool about a pivot point; and
    - (2) a second stop adapted to cooperate with the second guide block of the milling tool to limit the longitudinal position of the milling tool within the space between the bones of the joint.
- 10) The system of claim 9, wherein the second guide block is positioned proximate to the first guide block along the barrel.

11) The system of claim 9, further comprising:

a) a milling depth gauge, comprising:

(1) a shaft having a first end and a second end;

(2) a transverse saddle disposed on the second end of the shaft and adapted to receive the second guide block of the milling tool and to cooperate with the second stop of the machining fixture;

(3) a rod movably associated with the shaft and extendible therefrom, comprising a foot located at an end of the rod, and a contacting portion disposed on the foot; and

(4) an adjustable locking portion adapted to secure the degree of extension of the extendible rod.

12) The system of claim 11, wherein said shaft is hollow and said rod is slideably positioned within said hollow shaft.

13) The system of claim 11, wherein said first end is the distal end and said second end is the proximal end.

14) The system of claim 9, further comprising a transverse burring system, comprising:

a) a burring block adapted to cooperate with the machining fixture, comprising a distal threaded portion having an opening therein, and a proximal portion having an anterior-posterior positioning stop adapted to position a burring tool in the anterior-posterior direction and a lateral positioning stop adapted to limit lateral movement of the burring tool;

b) a burring adjustment ring, comprising an opening surrounded by a threaded portion corresponding to the threaded portion of the burring block, and a proximal edge adapted to cooperate with the machining fixture;

c) wherein when the burring adjustment ring is turned relative to the burring block, the burring block is raised or lowered relative to the machining fixture.

15) The system of claim 14, further comprising:

a) a burring tool comprising:

- (1) a power source attachment located at a distal end of the burring tool;
- (2) a longitudinally extending barrel having a positioning portion having first and second stops adapted to interact with the anterior-posterior positioning stop and the lateral positioning stop of the burring block to limit anterior-posterior position and lateral movement of the burring tool;
- (3) a rotatable burring shaft disposed within the longitudinally extending barrel and extending from the proximal end thereof, and comprising a burring blade at its proximal end.

16) The system of claim 15, wherein the centerline of the positioning portion is coincident with the centerline of the longitudinally extending barrel.

17) The system of claim 15, wherein the centerline of the positioning portion is offset with respect to the centerline of the longitudinally extending barrel.

18) The system of claim 15, further comprising:

a) a burring depth gauge, comprising:

- (1) a body having a proximal end and a distal end;
- (2) a positioning portion disposed on the shaft, comprising a positioning stop adapted to interact with the anterior-posterior positioning stop of the burring block;
- (3) a shaft movably associated with the body and extendable therefrom; and
- (4) an adjustable locking portion adapted to secure the degree of extension of the extendible shaft.

19) The system of claim 18, wherein said body is hollow, and said shaft is slideably positioned within said hollow body and is extendable from an opening in the proximal end of the body.